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Risk Assessment and Mitigation Phase

(Chapter SCG/SDG&E-Risk-6-QWP)

**Cybersecurity
Workpapers**

May 17, 2021

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| Overall Workpaper Description | This workpaper file explains the risk scoring and Risk Spend Efficiency (RSE) quantification. It contains necessary information and sources for calculating the risk score and RSE for respective mitigations and controls filed in the 2021 RAMP. |
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| "Master Inputs" Tab | This sheet contains the major MAVF inputs for risk scoring |
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|--------------------------|--|
| "RSE Summary" Tab | This sheet presents a summarized view of RSE scoring |
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|---------------------|---|
| RSE Equation | $\text{Risk Reduction} = (\text{Pre} - \text{Mitigated LoRE} * \text{Pre} - \text{Mitigated CoRE}) - (\text{Post} - \text{Mitigated LoRE} * \text{Post} - \text{Mitigated CoRE})$ |
| Discounted Time | $1 - \left(\frac{1}{\frac{(1 + \text{Benefit Discount Rate})^{\text{Benefits Lifetime}}}{\text{Benefit Discount Rate}}} \right)$ |
| RSE per \$M | $\frac{\text{Risk Reduction} * \text{Discounted Time}}{\text{Total Cost} (\$M)}$ |

Master Inputs

Discount Factors

| | |
|-------------------------|-------|
| Benefit Discount Factor | 3.00% |
|-------------------------|-------|

MAVF Framework

| | Range | Weight |
|--------------------------------|-------|--------|
| Safety Index | 20 | 60% |
| Reliability Index | 1 | 23% |
| Financial Cost | 500 | 15% |
| Stakeholder Satisfaction Index | 100 | 2% |

2021 RAMP
 SCG/SDG&E-RISK-6-QWP
 SCG/SDG&E Cybersecurity RSE Summary

| ID | Mitigation Name | Lifetime Benefit | Total Cost (\$k) | % Change in LoRE |
|----------------------|--|------------------|------------------|------------------|
| SCG-SDG&E-RISK-6-P1 | A1: Internal Defenses | 5.0 | \$29,430 | 24% |
| SCG-SDG&E-RISK-6-P1 | A1: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 5.0 | \$19,036 | 18% |
| SCG-SDG&E-RISK-6-P1 | A1: Perimeter Defenses | 5.0 | \$19,862 | 30% |
| SCG-SDG&E-RISK-6-P1 | A1: Sensitive Data Protection | 5.0 | \$22,207 | 12% |
| SCG-SDG&E-RISK-6-P2 | A2: Internal Defenses | 5.0 | \$44,092 | 37% |
| SCG-SDG&E-RISK-6-P2 | A2: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 5.0 | \$27,600 | 26% |
| SCG-SDG&E-RISK-6-P2 | A2: Perimeter Defenses | 5.0 | \$31,300 | 46% |
| SCG-SDG&E-RISK-6-P2 | A2: Sensitive Data Protection | 5.0 | \$31,499 | 17% |
| SCG-SDG&E-RISK-6-C02 | Planned: Internal Defenses | 5.0 | \$36,166 | 33% |
| SCG-SDG&E-RISK-6-C05 | Planned: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 5.0 | \$25,182 | 24% |
| SCG-SDG&E-RISK-6-C01 | Planned: Perimeter Defenses | 5.0 | \$26,737 | 41% |
| SCG-SDG&E-RISK-6-C03 | Planned: Sensitive Data Protection | 5.0 | \$27,635 | 16% |

2021 RAMP
 SCG/SDG&E-RISK-6-QWP
 SCG/SDG&E Cybersecurity RSE Summary

| ID | Mitigation Name | Pre-Mitigated LoRE | CoRE Safety | CoRE Financial | CoRE Reliability |
|----------------------|--|--------------------|-------------|----------------|------------------|
| SCG-SDG&E-RISK-6-P1 | A1: Internal Defenses | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-P1 | A1: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-P1 | A1: Perimeter Defenses | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-P1 | A1: Sensitive Data Protection | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-P2 | A2: Internal Defenses | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-P2 | A2: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-P2 | A2: Perimeter Defenses | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-P2 | A2: Sensitive Data Protection | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-C02 | Planned: Internal Defenses | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-C05 | Planned: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-C01 | Planned: Perimeter Defenses | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |
| SCG-SDG&E-RISK-6-C03 | Planned: Sensitive Data Protection | 0.17 | 1,693.80 | 2,449.29 | 8,662.18 |

2021 RAMP
 SCG/SDG&E-RISK-6-QWP
 SCG/SDG&E Cybersecurity RSE Summary

| ID | Mitigation Name | CoRE Stakeholder Satisfaction | CoRE | Post-Mitigated LoRE | Risk Reduction |
|----------------------|--|-------------------------------|----------|---------------------|----------------|
| SCG-SDG&E-RISK-6-P1 | A1: Internal Defenses | 676.47 | 13481.73 | 0.13 | 545.45 |
| SCG-SDG&E-RISK-6-P1 | A1: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 676.47 | 13481.73 | 0.14 | 409.09 |
| SCG-SDG&E-RISK-6-P1 | A1: Perimeter Defenses | 676.47 | 13481.73 | 0.12 | 681.81 |
| SCG-SDG&E-RISK-6-P1 | A1: Sensitive Data Protection | 676.47 | 13481.73 | 0.15 | 272.72 |
| SCG-SDG&E-RISK-6-P2 | A2: Internal Defenses | 676.47 | 13481.73 | 0.11 | 842.94 |
| SCG-SDG&E-RISK-6-P2 | A2: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 676.47 | 13481.73 | 0.13 | 588.75 |
| SCG-SDG&E-RISK-6-P2 | A2: Perimeter Defenses | 676.47 | 13481.73 | 0.09 | 1053.67 |
| SCG-SDG&E-RISK-6-P2 | A2: Sensitive Data Protection | 676.47 | 13481.73 | 0.14 | 392.50 |
| SCG-SDG&E-RISK-6-C02 | Planned: Internal Defenses | 676.47 | 13481.73 | 0.11 | 748.36 |
| SCG-SDG&E-RISK-6-C05 | Planned: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 676.47 | 13481.73 | 0.13 | 561.27 |
| SCG-SDG&E-RISK-6-C01 | Planned: Perimeter Defenses | 676.47 | 13481.73 | 0.10 | 935.46 |
| SCG-SDG&E-RISK-6-C03 | Planned: Sensitive Data Protection | 676.47 | 13481.73 | 0.14 | 374.18 |

2021 RAMP
 SCG/SDG&E-RISK-6-QWP
 SCG/SDG&E Cybersecurity RSE Summary

| ID | Mitigation Name | Discounted Time | RSE per \$Million | Data Sources |
|----------------------|--|-----------------|-------------------|---|
| SCG-SDG&E-RISK-6-P1 | A1: Internal Defenses | 4.58 | 84.88 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P1 | A1: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 4.58 | 98.42 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P1 | A1: Perimeter Defenses | 4.58 | 157.21 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P1 | A1: Sensitive Data Protection | 4.58 | 56.24 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P2 | A2: Internal Defenses | 4.58 | 87.55 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P2 | A2: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 4.58 | 97.69 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P2 | A2: Perimeter Defenses | 4.58 | 154.17 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P2 | A2: Sensitive Data Protection | 4.58 | 57.07 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-C02 | Planned: Internal Defenses | 4.58 | 94.77 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-C05 | Planned: Obsolete Information Technology (IT) Infrastructure and Application Replacement | 4.58 | 102.08 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-C01 | Planned: Perimeter Defenses | 4.58 | 160.23 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-C03 | Planned: Sensitive Data Protection | 4.58 | 62.01 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |

2021 RAMP
 SCG/SDG&E-RISK-6-QWP
 SCG CybersecurityRSE Summary

| ID | Mitigation Name | Lifetime Benefit | Total Cost (\$k) | % Change in LoRE | Pre-Mitigated LoRE | CoRE Safety |
|---------------------|--|------------------|------------------|------------------|--------------------|-------------|
| SCG-SDG&E-RISK-6-P1 | A1: Operational Technology (OT) Cybersecurity | 5.0 | \$14,555 | 36% | 0.09 | 2,595.24 |
| SCG-SDG&E-RISK-6-P2 | A2: Operational Technology (OT) Cybersecurity | 5.0 | \$20,518 | 51% | 0.09 | 2,595.24 |
| SCG-RISK-6-C04 | Planned: Operational Technology (OT) Cybersecu | 5.0 | \$19,460 | 49% | 0.09 | 2,595.24 |

2021 RAMP
 SCG/SDG&E-RISK-6-QWP
 SCG CybersecurityRSE Summary

| ID | Mitigation Name | CoRE Financial | CoRE Reliability | CoRE Stakeholder Satisfaction | CoRE | Post-Mitigated LoRE |
|---------------------|--|----------------|------------------|-------------------------------|----------|---------------------|
| SCG-SDG&E-RISK-6-P1 | A1: Operational Technology (OT) Cybersecurity | 1,881.37 | 5,732.64 | 620.00 | 10829.24 | 0.06 |
| SCG-SDG&E-RISK-6-P2 | A2: Operational Technology (OT) Cybersecurity | 1,881.37 | 5,732.64 | 620.00 | 10829.24 | 0.04 |
| SCG-RISK-6-C04 | Planned: Operational Technology (OT) Cybersecu | 1,881.37 | 5,732.64 | 620.00 | 10829.24 | 0.05 |

2021 RAMP
 SCG/SDG&E-RISK-6-QWP
 SCG CybersecurityRSE Summary

| ID | Mitigation Name | Risk Reduction | Discounted Time | RSE per \$Million | Data Sources |
|---------------------|--|----------------|-----------------|-------------------|---|
| SCG-SDG&E-RISK-6-P1 | A1: Operational Technology (OT) Cybersecurity | 347.93 | 4.58 | 109.48 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-SDG&E-RISK-6-P2 | A2: Operational Technology (OT) Cybersecurity | 500.73 | 4.58 | 111.77 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |
| SCG-RISK-6-C04 | Planned: Operational Technology (OT) Cybersecurity | 477.36 | 4.58 | 112.34 | > "Cost of Cyber Crime" studies (2017, 2019) > SME input |